

WHAT IS CLAIMED IS:

1. An apparatus for releasing an electrophoresis gel from a gel clamp, said gel clamp having a first clamping jaw and a second clamping jaw, said second clamping jaw being pivotal with respect to said first clamping jaw for clamping said gel between said first clamping jaw and said second clamping jaw, said apparatus comprising:

a first operating arm having an actuating area for engaging said first clamping jaw of said gel clamp; and

a second operating arm having an actuating area for engaging said second clamping jaw of said gel clamp, said first operating arm being movable with respect to said second operating arm between a disengaged position and an actuating position to open said first clamping jaw and said second clamping jaw to release said gel.

2. The apparatus of claim 1, wherein said first operating arm and said second operating arm engage said clamp to enable said gel to fall from said gel clamp and said apparatus.

3. The apparatus of claim 1, further comprising a support for supporting said gel clamp between said first operating arm and said second operating arm.

4. The apparatus of claim 1, further comprising a robotic arm for supporting said gel clamp between said first operating arm and said second operating arm.

5. The apparatus of claim 3, wherein said first operating arm and said second operating arm are coupled to said support.

6. The apparatus of claim 1, wherein said first operating arm is pivotally mounted for reciprocating movement toward said second operating arm.

7. The apparatus of claim 1, wherein said apparatus further comprises a first end member and a second end member, and wherein said first operating arm and said second operating arm each have a first end coupled to said first end member, and said first operating arm and said second operating arm each have a second end coupled to said second end member.

8. The apparatus of claim 7, wherein first operating arm and second operating arm are pivotally coupled to said first end member and to said second end member.

9. The apparatus of claim 8, said apparatus further comprising a support for supporting said gel clamp between said first operating arm and said second operating arm.

10. The apparatus of claim 9, wherein said support is positioned below said first end member and said second end member.

11. The apparatus of claim 10, wherein said first end member and said second end member are removably coupled to said support.

12. The apparatus of claim 9, wherein said support includes a first rail and a second rail, each of said first rail and said second rail having a recess for receiving said gel clamp and supporting said gel clamp between said first operating arm and said second operating arm.

13. The apparatus of claim 1, further comprising an actuating member to move said first operating arm with respect to said second operating arm.

14. The apparatus of claim 13, wherein said actuating member is a pneumatic piston and cylinder assembly coupled to said first operating arm and said second operating arm.

15. The apparatus of claim 1, further comprising a tank dimensioned to receive said electrophoresis gel, wherein said first operating arm and said second operating arm are positioned at a top end of said tank.

16. The apparatus of claim 15, further comprising a support positioned at said top end of said tank, said support having a first end member and a second end member, said first operating arm and said second operating arm being coupled to said support.

17. The apparatus of claim 16, wherein said first operating arm has a first end coupled to said first end member and a second end coupled to said second end member, and said second operating arm has a first end coupled to said first end member and a second end coupled to said second end member.

18. The apparatus of claim 17, wherein said first end member includes a first recess and said second end member includes a second recess, said first recess and said second recess being positioned between said first operating arm and second operating arm and being oriented to support said electrophoresis gel.

19. The apparatus of claim 18, wherein said first recess and said second recess are oriented to receive a respective end of said gel clamp.

20. The apparatus of claim 19, wherein said first recess and second recess each have a substantially V-shaped portion.

21. The apparatus of claim 20, wherein said first recess and second recess further include a slot at an apex of said V-shaped portion, said slot being dimensioned to receive said gel clamp.

22. The apparatus of claim 1, wherein said first operating arm includes an upper end and a lower end, said lower end defining a gel gripping area, and wherein said actuating area is positioned at said upper end of said first operating arm.

23. The apparatus of claim 22, wherein said first operating arm includes an actuating rib defining said actuating area for actuating said gel clamp.

24. The apparatus of claim 23, wherein said lower end of said first operating arm includes a rib defining said gripping area.

25. The apparatus of claim 24, wherein said second operating arm has an upper end and a lower end, said lower end defining a gel gripping surface, and where said actuating area is positioned at said upper end.

26. The apparatus of claim 25, wherein said second operating arm includes a rib defining said gel gripping surface.

27. The apparatus of claim 1, further comprising a rocker arm pivotally coupled to said first operating arm, said rocker arm being pivotal between a disengaging position and an actuating position.

28. The apparatus of claim 27, wherein said second operating arm has a lower end with a rib defining a gel gripping surface.

29. The apparatus of claim 27, wherein said rocker arm has a first end defining a gel gripping surface and a second end defining said actuating area of said first operating arm.

30. The apparatus of claim 28, wherein said gripping surface of said rocker arm and said gripping surface of said second operating arm are oriented to grip said gel, and said actuating areas are oriented to engage and open said gel clamp when said second operating arm is in said actuating position, thereby supporting said gel between said gripping surfaces, opening said first clamping jaw and said second clamping jaw, and relieving stresses on said gel between said first clamping jaw and said second clamping jaw.

31. An apparatus for relieving tension in an electrophoresis gel supported by a gel clamp, said gel clamp having a first clamping jaw and a second clamping jaw, said apparatus comprising:

a first movable operating arm having a gripping surface and an actuating surface; and

a second operating arm opposing said first operating arm and having a gripping surface and an actuating surface;

said first operating arm being movable with respect to said second operating arm between a disengaging position spaced from said gel and gel clamp and a clamping position, wherein said gripping surfaces of said first operating arm and said second operating arm grip said gel, and wherein said actuating surfaces engage said gel clamp to open said first clamping jaw and said second clamping jaw to release said gel.

32. The apparatus of claim 31, further comprising a support member to support said gel clamp between said first operating arm and said second operating arm.

33. The apparatus of claim 32, wherein said first operating arm and said second operating arm are coupled to said support.

34. The apparatus of claim 31, wherein said apparatus further comprises a first end member coupled to said first operating arm and said second operating arm, and a second end member coupled to said first operating arm and said second operating arm.

35. The apparatus of claim 34, wherein said first operating arm is pivotally coupled to said first end member and said second end

member, and wherein said second operating arm is pivotally coupled to said first end member and said second end member.

36. The apparatus of claim 35, further comprising a support member for supporting said gel clamp between said first operating arm and said second operating arm, and wherein said first end member and said second end member are supported by said support member.

37. The apparatus of claim 31, further comprising an actuator operatively connected to said first operating arm and said second operating arm to move said operating arms between said disengaged position and said clamping position.

38. The apparatus of claim 31, wherein said first operating arm includes a rocker arm pivotally coupled thereto, said rocker arm having a first end defining said gripping end and a second end defining said actuating end.

39. The apparatus of claim 38, wherein said first end of said rocker arm includes a first rib defining said gripping surface.

40. The apparatus of claim 39, wherein said first rib extends outwardly from a plane of said rocker arm.

41. The apparatus of claim 40, wherein said second end of said rocker arm includes a second rib extending outwardly from said plane of said rocker arm and substantially parallel to said first rib.

42. The apparatus of claim 31, wherein said gripping surface of said first operating arm and said gripping surface of said second operating arm have a length sufficient to grip and suspend said gel in a vertical orientation.

43. A method for relieving tension in an electrophoresis gel suspended by a gel clamp, said gel clamp having a first clamping jaw and a second clamping jaw, said method comprising the steps of:

gripping said electrophoresis gel with a gel handling assembly to apply sufficient force to suspend said gel in a vertical orientation,

opening said gel clamp for a time sufficient to relieve tension in said gel while gripping and suspending said gel by said gel handling assembly,

closing said gel clamp onto said gel, and

releasing said gel from said gel handling assembly.

44. The method of claim 43, wherein said gel handling assembly comprises a first movable operating arm having a gripping surface and an actuating surface, and a second movable operating arm opposing said first operating arm and having a gripping surface and an actuating surface, said method comprising moving said first operating arm with respect to said second operating arm, whereby said gripping surfaces contact said gel and grip said gel before said actuating surfaces contact said gel clamp and open said gel clamp.

45. The method of claim 44, wherein said first operating arm includes a rocker arm having a first end defining said gripping surface and a second end defining said actuating surface.

46. A method of processing an electrophoresis gel comprising the steps of:

suspending said gel by a gel clamp, said gel clamp having a first clamping jaw and a second clamping jaw, said gel being clamped between respective clamping surfaces of said first clamping jaw and said second clamping jaw;

contacting said gel with at least one treating liquid, gripping said gel with a gel handling assembly with sufficient force to suspend said gel in a vertical orientation,

opening said first and second clamping jaws of said gel clamp while suspending said gel by said gel handling assembly for sufficient time to relieve tension in said gel caused by shrinking or expansion of said gel,

closing said first and second clamping jaws of said gel clamp to grip said gel, and

releasing said gel from said gel handling assembly.

47. The method of claim 46, wherein said treating liquid is a staining reagent and said method further comprises staining said gel.

48. The method of claim 46, wherein said treating liquid is contained in a tank having a dimension to receive said gel in said vertical orientation.

49. The method of claim 48, comprising providing a support positioned above said tank and positioning said gel clamp on said support.

50. The method of claim 48, wherein said gel handling assembly is positioned above said tank.

51. The method of claim 50, wherein said gel handling assembly comprises a first movable operating arm and a second operating arm, said method comprising moving said first operating arm with respect to said second operating arm and gripping said gel.

52. The method of claim 51, wherein said first operating arm and said second operating arm are pivotally coupled to a first end member and to a second end member.

53. The method of claim 51, wherein said first operating arm includes a first end having a gripping surface for gripping said gel and a second end having an actuating surface for contacting said gel clamp, and said second operating arm includes a first end having a gripping surface and a second end having an actuating surface, said method comprising bringing said first and second operating arms into contact with said gel and said gel clamp.

54. The method of claim 53, wherein said first arm includes a rocker arm having a first end defining said gripping surface and a second end defining said actuating surface.

55. The method of claim 46, further comprising a robotic arm for coupling to said gel clamp, said method comprising supporting said gel and said gel clamp by said robotic arm in said gel handling assembly.